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EXAMINER	
MALKOWSKI, KENNETH J	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/668,029	Applicant(s) MOORTHY ET AL.	
	Examiner Kenneth J. Malkowski	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 10-28 and 32-38 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0126644 to Turpin et al.

With respect to claims 1, 12 and 32 Turpin discloses an apparatus comprising: at least a first and a second electrical signal input (S1(t), S2(t), Figure 3) having at least: a first output providing a first optical signal characterized by a first carrier wavelength (page 8 paragraph 99 (detector architecture can be used as a multi-channel correlator))(figure 6), wherein the first optical signal corresponds to a first electrical signal (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion))(page 8 paragraph 100 (output of signal conversion means is a light beam 78 that is intensity modulated)); and a second output providing a second optical signal characterized by a second carrier wavelength that is different than the first carrier wavelength (page 8 paragraph 99 (detector architecture can be used as a multi-channel correlator))(figure 6), wherein the second optical signal corresponds to a second electrical signal ((page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion))(page 8 paragraph

100 (output of signal conversion means is a light beam 78 that is intensity modulated)); an optical correlator that receives at least the first and second optical signal and that has an output (30, Figure 3 (multi-channel optical correlator)) at least simultaneously comprising (page 4 paragraph 56 (the receiver must simultaneously decode or de-spread information to restore the information to its original bandwidth))(page 7 paragraph 92 (multichannel optical correlation processor simultaneously correlated the received signal with a set of hypothesized waveforms)): a first correlation result optical signal that corresponds to an amount of correlation between the first optical signal and a correlation reference (page 5 paragraph 62 (the optical correlator is provided with an appropriate set of reference hypothesis and one receiver algorithm depending on the exact receiver function to be performed)); and a second correlation result optical signal that corresponds to an amount of correlation between the second optical signal and the correlation reference (page 1 paragraph 6 (data generated by the optical correlator is fed to one or more receiver algorithms which identify, sort and separate the transmissions of various simultaneous users))(page 5 paragraphs 66-67 (correlation is the measurement of similarity of one or more characteristics of two entities, received waveforms and hypothesis create a measured correlation as a function of time offsets)).

With respect to claim 2, Turpin discloses the apparatus of claim 1 wherein the optical correlator (30, Figure 3) comprises optical correlator filter means for filtering the first and second optical signals as a function, at least in part, of the correlation reference (page 6 paragraph 74 (when a particular hypothesis matches one of the unique waveforms at one of the time delays, the magnitude is maximized to create an

autocorrelation, otherwise a cross-correlation results. In this way filtering takes place where the passed signal is the autocorrelation signal and the filtered signal is the cross-correlated signal))(page 5 paragraphs 66-71 (equations (1-5) shows how received waveforms are filtered as a function of the correlation reference; paragraph 70 states the value in equation 3 is the value of the correlation between the received waveform and the hypothesis at a certain time offset, while paragraph 67 states the correlation is measured as a function of time offsets)).

With respect to claim 3, Turpin discloses the apparatus of claim 2 wherein the correlation reference comprises a reference signal signature (page 7 paragraph 92 optical correlation processor correlates the received signal with a set of hypothesized waveforms encompassing all probable or known signature waveforms)).

With respect to claim 4, Turpin discloses the apparatus of claim 3 wherein the reference signal signature comprises a code division multiple access de-spreading code (page 4 paragraph 56 (receiver simultaneously decodes or de-spreads the information to restore it to its original bandwidth))(page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)).

With respect to claim 5, Turpin discloses the apparatus of claim 1 and further comprising a flat lens having unity transmittance (124, Figure 14 (beam forming lenses) and that is disposed optically upstream of a Fourier lens disposed between the first and second electrical signal input and the first and second output (126, Figure 14 (integration lenses))(page 11 paragraph 137).

With respect to claim 10, Turpin discloses the apparatus of claim 1 and further comprising a multiple wavelength photo-detector array (112, Figure 14 (photo diode array))(24, Figure 1 (data recovery)) disposed optically subsequent to the optical correlator (80, Figure 14)(20, Figure 1 (matched filter correlator)).

With respect to claims 11 and 13, Turpin discloses the apparatus of claim 1 and further comprising at least: a first radio frequency antenna that facilitates provision of the first electrical signal; and a second radio frequency antenna that facilitates provision of the second electrical signal (12, Figure 3, several RF antennas are represented accepting multiple RF signals))(page 6 paragraph 81 (receiving means or antenna are used to receive multi-user transmission signals)).

With respect to claims 14-15, Turpin discloses the method of claim 12 wherein converting the first and second electrical signals (S1(t), S2(t), Figure 3) into corresponding first and second optical signals (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion)) comprises simultaneously converting a plurality of temporally differentiated samples (page 2 paragraph 13 (correlator architecture posses the quality of using time offsets wherein a time-varying vector represents the results of correlation)) of the first and second electrical signal into a corresponding plurality of temporally differentiated first and second optical signals (page 1 paragraph 6 (the multi-channel optical correlators conduct simultaneous processing of the optical signal to simultaneously conduct billions of calculations))(page 5 paragraph 62 (signal conversion

means provides inputs to a multi-channel optical correlator where relative time delays are estimated)).

With respect to claim 16, Turpin discloses the method of claim 15 wherein converting the first electrical signal signals (S1(t), S2(t), Figure 3) into a corresponding first optical signal (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion)) and converting the second electrical signal signals (S1(t), S2(t), Figure 3) into a corresponding second optical signal (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion)) comprises simultaneously (page 1 paragraph 6 (the multi-channel optical correlators conduct simultaneous processing of the optical signal to simultaneously conduct billions of calculations))(page 5 paragraph 62 (signal conversion means provides inputs to a multi-channel optical correlator where relative time delays are estimated)) passing the plurality of temporally differentiated first optical signals and the plurality of temporally differentiated second optical signals through at least a first Fourier lens to provide a first and second Fourier transformed optical signal (125, imaging lens, Figure 14).

With respect to claim 17, Turpin discloses the method of claim 16 wherein converting the first electrical signal (S1(t), S2(t), Figure 3) into a corresponding first optical signal (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion)) and converting the second electrical signal (S1(t), S2(t), Figure 3) into a corresponding

second optical signal (page 5 paragraph 62 (signal conversion means for converting received signals into a form suitable for the optical correlator))(14, Figure 3 (signal conversion)) further comprises distorting at least one of the first and second Fourier transformed optical signals to provide at least one distorted Fourier transformed optical signal (124, 126, Figure 14, beam-forming and beam integration lenses)).

With respect to claim 18, Turpin discloses the method of claim 17 wherein distorting at least one of the first and second Fourier transformed optical signals comprises distorting at least one of the first and second Fourier transformed optical signals to thereby facilitate accurately correlating the optical signal that is distorted to the reference signal (Figure 14 depicts said Fourier transformed signals wherein Fourier distortion that takes place via optical lenses prior to correlation. In this way the distortion imparted inherently facilitates the accurate correlation of said optical signals). The forming lenses, imaging lenses and integration lenses (page 11 paragraph 137) process the main beam 118 (page 11 paragraph 138) such that the output at the photo-detector array (112, figure 14) has a complex value equal to correlation values (90, Figure 14)(page 11 paragraph 139). Furthermore said lens arrangement can be implemented in several different embodiments as taught by Turpin (page 11 paragraph 137).

With respect to claim 19, Turpin discloses the method of claim 12 wherein simultaneously optically correlating a reference signal (page 5 paragraph 62 (the optical correlator is provided with an appropriate set of reference hypothesis and one receiver algorithm depending on the exact receiver function to be performed)) with each of the first optical signal and the second optical signal (page 4 paragraph 56 (the receiver

must simultaneously decode or de-spread information to restore the information to its original bandwidth))(page 7 paragraph 92 (multichannel optical correlation processor simultaneously correlated the received signal with a set of hypothesized waveforms)) comprises providing a first correlation output signal as a function, at least in part, of how closely the first optical signal correlates to the reference signal and a second correlation output signal as a function, at least in part, of how closely the second optical signal correlates to the reference signal (page 6 paragraph 78 (the output of the correlator is the correlation between each PN sequence and received RF signals))(page 6 paragraph 74 (with multiple signals with multiple time delays correlation is composed of the sum of autocorrelation and sum of all cross-correlations)).

With respect to claim 20, Turpin discloses the method of claim 19 wherein the reference signal comprises a Fourier (frequency) representation of a time-based signal (page 3 paragraph 30 (Figure 5 shows the multichannel optical correlator illustrating complex correlation at an IF frequency))(page 7 paragraph 89 (multichannel correlator performs complex correlation at an IF frequency))(Figure 5 entitled frequency correlator)(page 6 paragraph 74 (autocorrelation, cross-correlation used wherein each entry has a complex value and the phase measuring the radio-frequency phase difference between the hypothesis and received waveform)).

With respect to claim 21, Turpin discloses the method of claim 19 and further comprising distorting at least one of the first and second correlation output signals to provide a distorted correlation output signal (124, 126, Figure 14, beam-forming and beam integration lenses)).

With respect to claims 22-23 Turpin discloses the method of claim 21 and further comprising converting the distorted correlation output signal out of the Fourier domain into a corresponding electrical signal to provide a resultant correlation output signal (112, Figure 14 is a photodiode array which converts the correlations into an electrical signals 90)(page 9 paragraph 112 (correlation output 90 is output from optical to electrical sensing rows))(page 10 paragraph 125 (optical beams exiting optical correlator illuminate an array of photo detectors to produce an electrical output)).

With respect to claims 24 Turpin discloses a code division multiple access page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) radio (page 3 paragraph 47 (receiver accepts signals transmitted through free-space that are assigned a particular radio frequency)) receiver comprising (page 4 paragraph 56 (receiver simultaneously decodes or de-spreads the information to restore it to its original bandwidth))(page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)): a plurality of antennas (12, Figure 3, several RF antennas are represented accepting multiple RF signals))(page 6 paragraph 81 (receiving means or antenna are used to receive multi-user transmission signals)); at least a first despreading code (page 4 paragraph 56 (the receiver must simultaneously despread the received signals)); a multiple wavelength optical correlator that is operably coupled to the plurality of antennas and the first spreading code (Figure 3 depicts the optical correlator 30, coupled to the plurality of antennas 12)).

With respect to claim 25 Turpin discloses the code division multiple access (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Multiple Access systems)) radio receiver of claim 24 wherein the multiple wavelength optical correlator (30, Figure 3 (multi-channel optical correlator)) comprises an emissive multiple wavelength spatial light modulator having an input operably coupled to the plurality of antennas (Figure 3 depicts the optical correlator 30, coupled to the plurality of antennas 12)) and having a plurality of optical output signals, wherein each of the optical output signals has a carrier wavelength that is unique to a given one of the antennas (22, Figure 3 are optical signals wherein each one, for example C1, C2 and CN-1 have wavelengths corresponding to the plurality of received antenna signals S1, S2, and SN-1 depicted with the number 10).

With respect to claim 26 Turpin discloses the code division multiple access radio (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) receiver of claim 25 (Figure 3) and further comprising a substantially flat lens having unity transmittance (124, Figure 14 (beam forming lenses) and that is disposed optically upstream of a Fourier lens having an optical input disposed to receive the plurality of optical output signals and an output providing corresponding Fourier domain optical output signals 125, Figure 14 (imaging lenses))(page 11 paragraph 137).

With respect to claim 27 Turpin discloses the code division multiple access (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) radio receiver (Figure 3) of claim 26 and further

comprising a first Fourier distorter having an optical input disposed to receive the Fourier domain optical output signals and an optical output that provides distorted Fourier domain optical output signals (125, Figure 14 (imaging lenses))(page 11 paragraph 137).

With respect to claim 28, Turpin discloses the code division multiple access (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) radio receiver (Figure 3) of claim 27 and further comprising an optical correlator filter (80, figure 14) having an optical input disposed to receive the distorted Fourier domain optical output signals (input is received form imaging lenses 125 in Figure 14) and an optical output that provides a correlation result optical output signal for each of the plurality of optical output signals (page 6 paragraph 74 (when a particular hypothesis matches one of the unique waveforms at one of the time delays, the magnitude is maximized to create an autocorrelation, otherwise a cross-correlation results. In this way filtering takes place where the passed signal is the autocorrelation signal and the filtered signal is the cross-correlated signal)).

With respect to claim 33, Turpin discloses the method of claim 32 wherein simultaneously converting further comprises proximally grouping the optical signals as a function of the temporal correspondence of the data elements that correspond to the optical signals (Figure 6 shows that there is one column for each temporal correspondence to a time value such as t1, t2 and tN as shown)), such that optical signals of the first and second optical signals that correspond to data elements that represent a substantially common point in time are grouped together (page 8 paragraph

98 (TDI or time delay and integrate sensors produce a time shift of the received signal against each hypothesis))(page 8 paragraph 92 (optical correlation output has one datum for each possible time offset, thereby grouping with respect to time))(page 10 paragraph 125 (each separate beam illuminates a column of constant time delay of the hypothesis mask)).

With respect to claim 34, Turpin discloses the method of claim 33 wherein providing electrical signals comprising at least a first and a second set of data further comprises providing electrical signals (page 10 paragraph 125 (a plurality of beams strike the photodiodes 112, to produce an instantaneous electrical signal with either a voltage or current which is a measure of correlation)) comprising at least a first and second set of data wherein each of the sets of data comprises at least twelve temporally dispersed data elements (Figure 12, M data sets are shown wherein M can be any number including 12 or more))(page 11 paragraphs 132 and 133 the output electrical correlation signals C1-CM are calculated for each instance in time)).

With respect to claims 35-36, Turpin discloses the method of claim 33 wherein providing electrical signals comprising at least a first and a second set of data (Figure 12, M data sets are shown wherein M can be any number including 12 or more))(page 11 paragraphs 132 and 133 the output electrical correlation signals C1-CM are calculated for each instance in time)) further comprises providing electrical signals comprising at least a first and second set of data wherein each of the sets of data corresponds to a transmission as received by an antenna (Figure 3 depicts antennas 12 accepting S1-Sn which correspond to converted optical signals C1-CN), such that the

first set of data corresponds to a transmission as received by a first antenna and the second set of data corresponds to a transmission as received by a second antenna (C1, C2, CM following the photo diode array in 14 correspond to the received radio frequency signals shown in figure 3, S1, S2, SN)(page 11 paragraph 139 (output of photodetector array produces an electrical signal with a complex modulation equal to correlation values)) such that the first set of data corresponds to a transmission that comprises a first spreading code as received by a first antenna and the second set of data corresponds to the transmission as received by a second antenna (page 3 paragraphs 46-47 invention is useful for spread spectrum communications systems wherein each signal as a unique spread spectrum sequence)).

With respect to claims 37-38, Turpin discloses a method of preparing optical data for correlation in a spectral domain with a correlation reference (page 5 paragraphs 66-71 (equations (1-5) shows how received waveforms are filtered as a function of the correlation reference; paragraph 70 states the value in equation 3 is the value of the correlation between the received waveform and the hypothesis at a certain time offset, while paragraph 67 states the correlation is measured as a function of time offsets))(page 6 paragraph 74 (when a particular hypothesis matches one of the unique waveforms at one of the time delays, the magnitude is maximized to create an autocorrelation, otherwise a cross-correlation results. In this way filtering takes place where the passed signal is the autocorrelation signal and the filtered signal is the cross-correlated signal)), comprising the steps of: receiving a plurality N of sets of optical signals representing spectral domain representations of a plurality N of sets of

temporally distributed data elements (Figure 6 photodiode 76 produces M sets of optical signals with a plurality of N sets of temporally distributed data elements as shown 82), wherein each of the plurality N of sets of optical signals has a unique carrier wavelength as compared to others of the plurality N of sets of optical signals (30, Figure 3, the optical correlator is a multichannel correlator); optically distorting at least some of the optical signals to normalize the spectral domain representations with respect to the correlation reference (various lenses 124, 125, and 126 distort the optical information as shown in Figure 14)(page 11 paragraph 137).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6-8 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0126644 to Turpin et al. in view of U.S. Patent No. 6,529,614 to Chao et al.

With respect to claims 6-8, Turpin discloses the apparatus of claim 5 and further comprising at least one Fourier distorter [on page 8 paragraph 33 of the specification applicant states a Fourier distorter simply repositions the Fourier transformed optical signals and again physically group the time associated data elements to normalize the optical signal](124, 126 Figure 14) with a pair of Fourier lenses (lens 125, Figure 14)

and an optical correlator (80, Figure 14). However, Turpin does not disclose the identical setup as claimed by applicant wherein the Fourier distorter is disposed between the Fourier lens and the correlator and there is also a Fourier distorter disposed optically subsequent to the correlator. Despite this such an optical setup is commonly known in the art and cannot be considered a patentable limitation. Chao, from the same field of endeavor discloses a hybrid optoelectronic optical correlator parallel processing system (columns 1-2 lines 65-67 and 1-3) wherein a Fourier distorter (400, Figure 6) is disposed between the Fourier lens (302, Figure 6 (Fourier lens)) and the correlator (214, Figure 6 (filter slim)) and there is also a Fourier distorter (402, Figure 6) disposed optically subsequent to the correlator (214, Figure 6 (filter slim)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the order of components as disclosed by Chao et al. to the optical correlator as disclosed by Turpin. The motivation for doing so would have been to provide flexible focal length adjustment capability (column 8 lines 15-20), fine-tuning and path length minimization (column 8 lines 33-36). Furthermore, any optical element, including a "Fourier distorter," must inherently be a fixed element or a dynamic element. The distortion element as taught by Chao can be continuously adjusted (column 8 lines 29-31).

With respect to claims 29-30, Turpin discloses the code division multiple access (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) radio receiver (Figure 3) of claim 28 and further comprising a second Fourier distorter (two imaging lenses 125 are shown in

Figure 14). However, the second optical Fourier distorter of Turpin is not explicitly shown after the correlation results. Despite this such an optical setup is commonly known in the art and cannot be considered a patentable limitation. Chao, from the same field of endeavor discloses a hybrid optoelectronic optical correlator parallel processing system (columns 1-2 lines 65-67 and 1-3) wherein a Fourier distorter (400, Figure 6) is disposed between the Fourier lens (302, Figure 6 (Fourier lens)) and the correlator (214, Figure 6 (filter slim)) and there is also a Fourier distorter (402, Figure 6) disposed optically subsequent to the correlator (214, Figure 6 (filter slim)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the order of components as disclosed by Chao et al. to the optical correlator as disclosed by Turpin. The motivation for doing so would have been to provide flexible focal length adjustment capability (column 8 lines 15-20), fine-tuning and path length minimization (column 8 lines 33-36). Furthermore, any optical element, including a "Fourier distorter," must inherently be a fixed element or a dynamic element. The distortion element as taught by Chao can be continuously adjusted (column 8 lines 29-31).

With respect to claim 31, Turpin in view of Chao disclose the code division multiple access (page 3 paragraph 46 (the present invention has particular utility in spread spectrum Code Division Multiple Access systems)) radio receiver of claim 30 (page 3 paragraph 47 (receiver accepts signals transmitted through free-space that are assigned a particular radio frequency)) and further comprising a multiple wavelength photodetector array having an optical input disposed to receive the restored correlation result optical output signals and an output comprising electrical signals (112, Figure 14

(photo diode array))(24, Figure 1 (data recovery)) that individually correspond to restored correlation result optical output signals for each of the plurality of antennas (C1, C2, CM following the photo diode array in 14 correspond to the received radio frequency signals shown in figure 3, S1, S2, SN)(page 11 paragraph 139 (output of photodetector array produces an IF signal with a complex modulation equal to correlation values)).

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0126644 to Turpin et al. in view of U.S. Patent No. 6,529,614 to Chao et al. and further in view of U.S. Patent No. 6,570,708 to Bergeron et al.

With respect to claim 9, Turpin in view of Chao disclose the apparatus of claim 8, however, fail to disclose at least one Fourier lens disposed optically subsequent to the at least one Fourier distorter. Bergeron, from the same field of endeavor discloses an image processing apparatus (title) including an optical correlator used as an optical processor (column 3 lines 9-12) wherein the final element prior to the photodector is a Fourier distorter (30, Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art to situate the Fourier lens after optical distortion elements as taught by Burgeron in the optical correlation system as taught by Turpin in view of Chao. The motivation for doing so would have been to return the optical signal to its original condition prior to the entering the initial Fourier lens in order to be in a suitable form for photo-detection (Bergeron: column 5 lines 51-56 (optical processor has a second lens for performing the inverse Fourier transform of a combined image formed within the

area defined by the filter plane thereby allowing for electrical output indicative of light intensity distribution at the optical detector array 32)).

6. Claims 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0126644 to Turpin et al. in view of U.S. Patent No. 5,274,716 to Mitsouka et al.

With respect to claims 39-41 Turpin discloses the method of claim 38 wherein optically distorting further comprises receiving a plurality N of sets of optical signals representing spectral domain representations of a plurality N of sets of temporally distributed data elements (Figure 6 photodiode 76 produces M sets of optical signals with a plurality of N sets of temporally distributed data elements as shown 82), wherein each of the plurality N of sets of optical signals has a unique carrier wavelength as compared to others of the plurality N of sets of optical signals (30, Figure 3, the optical correlator is a multichannel correlator) and using an optical pathway to create distortion (various lenses,124, 125, and 126 distort the optical information as shown in Figure 14)(page 11 paragraph 137). However, Turpin fails to disclose at least one dynamically alterable pathway characteristic to normalize the spectral domain with respect to the correlation reference. Mitsouka, from the same field of endeavor also discloses an optical correlator (Figure 1)(column 2 lines 9-12 (correlator for correlation processing)) which also uses Fourier transformation lenses (column 1 lines 25-26) as well as a correlation reference signal (column 1 lines 40-42) which has at least one dynamically alterable pathway characteristic to thereby normalize (10, Figure 1 (normalization unit)) the spectral domain representations with respect to the correlation reference (column 2

lines 31-38 (means located before or after reference image to change transmittance or reflectance at a portion corresponding to each reference image in a linear or non-linear relationship with the correlation coefficient, and means to determine or change the linear or non-linear relationship))(Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art to implement the dynamically alterable pathway characteristic as disclosed by Turpin into the optical correlation system as disclosed by Turpin. The motivation for doing so would have been to properly adjust for different references input into the correlator with low noise levels for more accurate correlation results (Mitsouka: coloumn 1 lines 57-66).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to show the state of the art with respect to optical correlation in a receiver setting:

U.S. Patent No. 6,137,612 is cited for Fourier transform manipulation using optical lenses

U.S. Patent Application Publication No. 2003/0020990 is cited to show dynamic channel equalization in a correlation setting

U.S. Patent No. 6,972,905 is cited to show Fourier manipulation with controllable filter elements in optical correlation systems

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Malkowski whose telephone number is (571) 272-5505. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KJM 9/25/06

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER